

**CLAIMS**

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1        1. A dual map system in a vehicle for navigation and wireless communication  
2        comprising:  
3                a location device to identify a position of the vehicle;  
4                a wireless communication device;  
5                a measurement device which determines the quality of wireless  
6        communication;  
7                a storage device for storing a navigation map and a wireless coverage  
8        map; and  
9                a system control unit connected to receive inputs from each of said  
10       location device, said wireless communication device, said measurement  
11       device and said storage device, said system control unit updating the wireless  
12       coverage map based on information from said measurement device and  
13       determining whether reliable communications can be established with said  
14       wireless communication device based on current location information from  
15       said location device and said street map as compared with an updated version  
16       of said wireless coverage map.
- 1       2. The system of claim 1 further comprising a user interface between the  
2       system control unit and a user, the user interface permitting a user to input  
3       commands to the system control unit and providing output to the user from the  
4       system control unit.

1 3. The system of claim 2 further comprising a computer process installed on  
2 said system control unit, said computer process called a user interface  
3 manager, the user interface manager having access to the navigation map and  
4 the wireless coverage map and interacting with the user interface and the  
5 location device such that the user interface manager interprets user commands  
6 entered by a user from the user interface to execute the user's commands and  
7 presents results and notification of events to the user by the user interface.

1 4. The system of claim 2 further comprising a computer process installed on  
2 said system control unit, said computer process called a navigation manager,  
3 the navigation manager having access to the navigation map and the wireless  
4 coverage map and interacting with the user interface and the location device  
5 such that the navigation manager receives information from the location  
6 device and computes a route based on information in both the navigation map  
7 and wireless coverage map according to a user input.

1 5. The system of claim 2 further comprising a computer process installed on  
2 said system control unit, said computer process called a coverage manager, the  
3 coverage manager having access to the navigation map and the wireless  
4 coverage map and interacting with the user interface, the location device, and  
5 the measurement device such that the coverage manager initializes itself by a  
6 current version of the wireless coverage map, monitors current status of  
7 wireless coverage by interacting with the measurement device, predicts status  
8 of wireless coverage by looking at a route plan and the wireless coverage map,  
9 and notifies the user interface of events that are important to maintaining a  
10 wireless connection, the coverage manager further updating the wireless  
11 coverage map by new measurements from the measurement device and

12 generating information about estimated time or distance until a next event of  
13 communication loss or interruption and estimates time until regaining  
14 coverage.

1 6. The system of claim 2 further comprising a computer process installed on  
2 the system control unit, said computer process called a connection manager,  
3 the connection manager having access to the wireless communication device  
4 and the wireless coverage map and interacting with the user interface such that  
5 the connection manager receives information from the user interface as when  
6 to make a connection and commands the wireless communication device to  
7 make a connection based on user input and information from the wireless  
8 coverage map.

1 7. The system of claim 2 further comprising:

2 a first computer process installed on said system control unit, said first  
3 computer process called a user interface manager, the user interface manager  
4 having access to the navigation map and the wireless coverage map and  
5 interacting with the user interface and the location means such that the user  
6 interface manager interprets user commands entered by a user from the user  
7 interface to execute the user's commands and presents results and notification  
8 to the user by the user interface;

9 a second computer process installed on said system control unit, said  
10 second computer process called a navigation manager, the navigation manager  
11 having access to the navigation map and the wireless coverage map and  
12 interacting with the user interface manager and the location device such that  
13 the navigation manager receives information from the location device and  
14 computes a route based on information in both the navigation map and

15 wireless coverage map according to a user input;  
16 a third computer process installed on said system control unit, said  
17 third computer process called a coverage manager, the coverage manager  
18 having access to the navigation map and the wireless coverage map and  
19 interacting with the user interface manager, the location device, and the  
20 measurement device such that the coverage manager initializes itself by a  
21 current version of the coverage map, monitors current status of coverage by  
22 interacting with the measurement device, predicts status of coverage by  
23 looking at the route plan generated by the navigation manager and the wireless  
24 coverage map, and notifies the user interface manager of events that are  
25 important to maintaining wireless connection, the coverage manager further  
26 updating the wireless coverage map by new measurements from the  
27 measurement device and generates information about estimated time or  
28 distance until a next event of communication loss or interruption and estimates  
29 time until regaining coverage; and  
30 a fourth computer process installed on the system control unit, said  
31 fourth computer process called a connection manager, the connection manager  
32 having access to the wireless communication device and the wireless coverage  
33 map and interacts with the user interface manager and the coverage manager  
34 such that the connection manager receives information from the user interface  
35 manager and the coverage manager as when to make a connection and  
36 commands the wireless communication device to make a connection based on  
37 user input and information from the coverage manager.

1 8. The system of claim 1 in which the wireless overage map is a  
2 predetermined wireless coverage map.

1 9. The system of claim 8 in which the system control unit updates the wireless  
2 coverage map by making measurements as the vehicle moves.

1 10. The system of claim 9 in which the system control unit updates a  
2 collective wireless coverage map stored at a server.

1 11. The system of claim 10 in which multiple vehicles update the collective  
2 wireless coverage map stored at the server.

1 12. The system of claim 11 in which the system control unit updates the  
2 wireless coverage map in the storage device in the vehicle by obtaining data  
3 from the server derived from the collective wireless coverage map.

1 13. The system of claim 1 in which the multiple wireless coverage maps are  
2 stored on the storage device, each of the wireless coverage maps being  
3 provided by different wireless service providers.

1 14. The system of claim 1 in which the location device is a GPS receiver.

1 15. The system of claim 1 in which the location device is a radio triangulation  
2 system.

1 16. The system of claim 15 in which the radio triangulation system is a  
2 LORAN-type system.